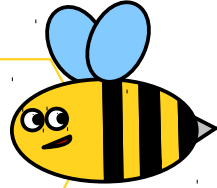


ハニカムパネルの剛性と挙動

9011165 田部井 香月

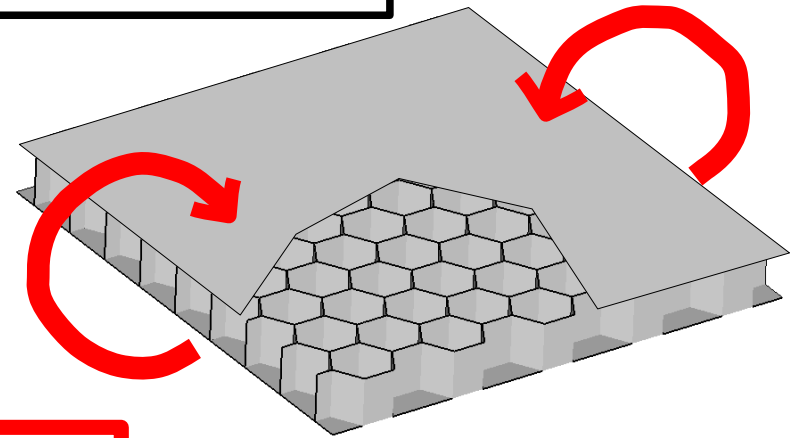
ハニカム構造とは...

Honeycomb



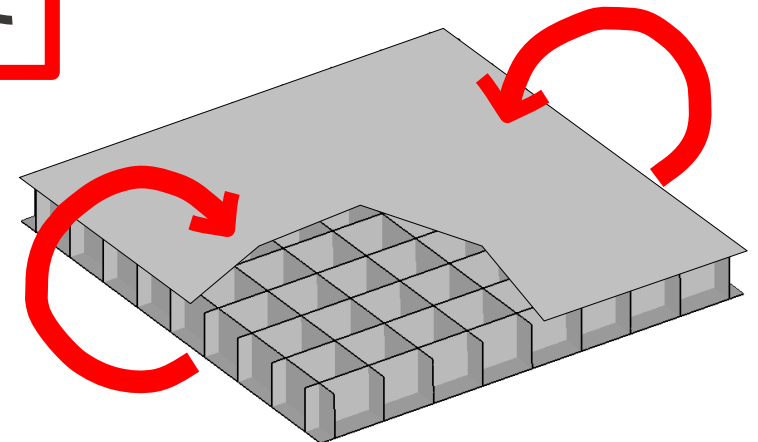
- ・軽量・高強度
- ・衝撃吸収
- ・散光・装飾...

ハニカムパネル



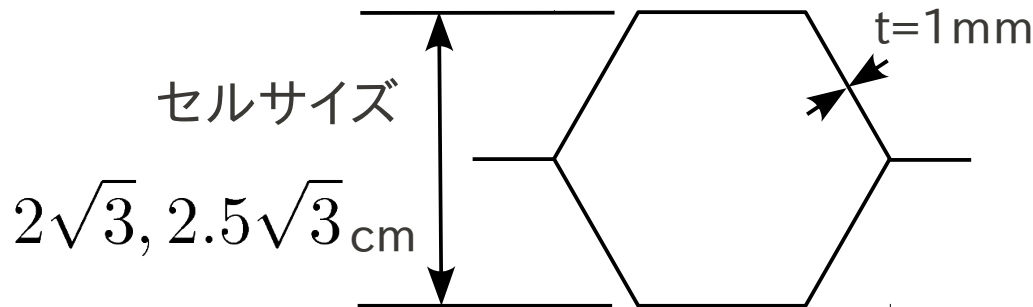
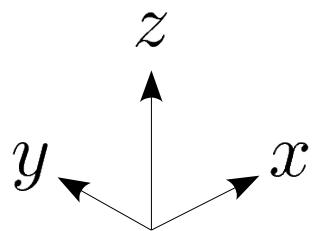
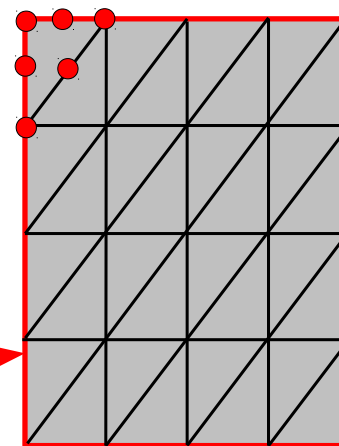
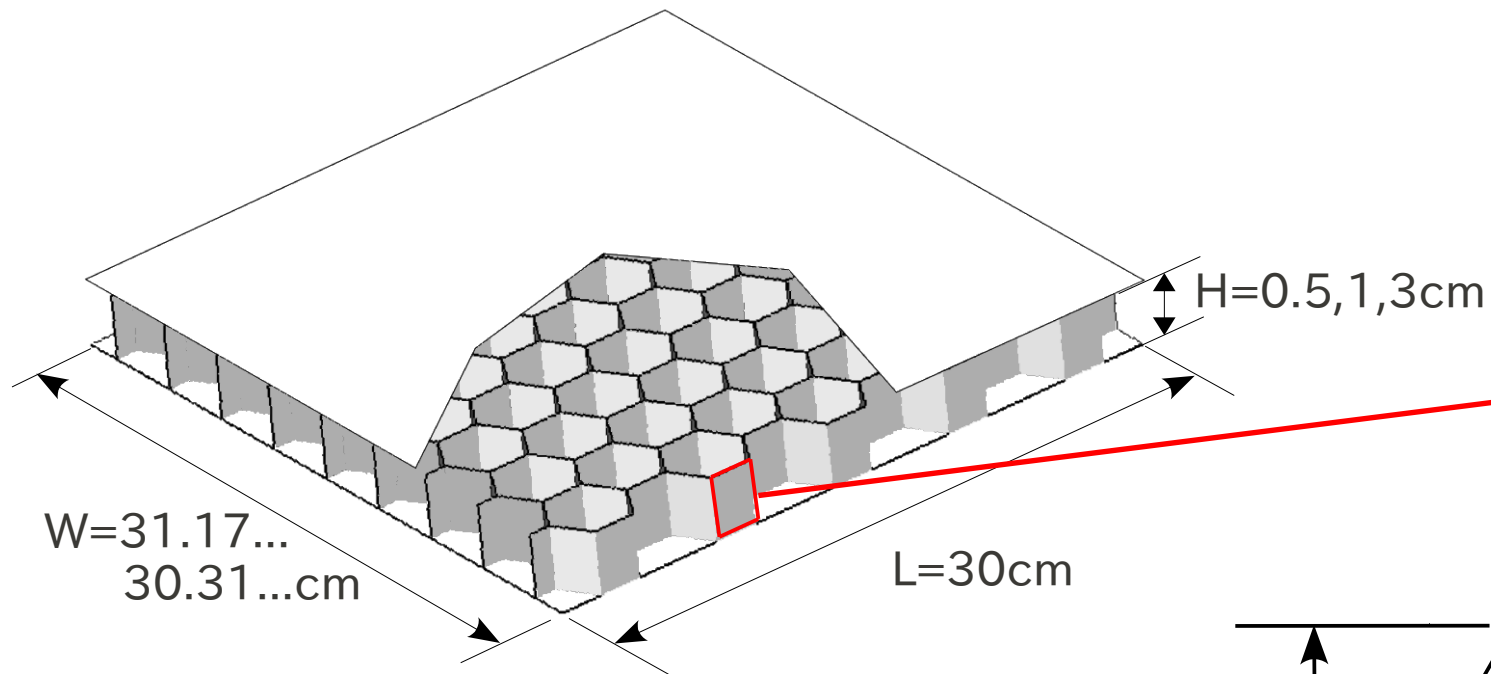
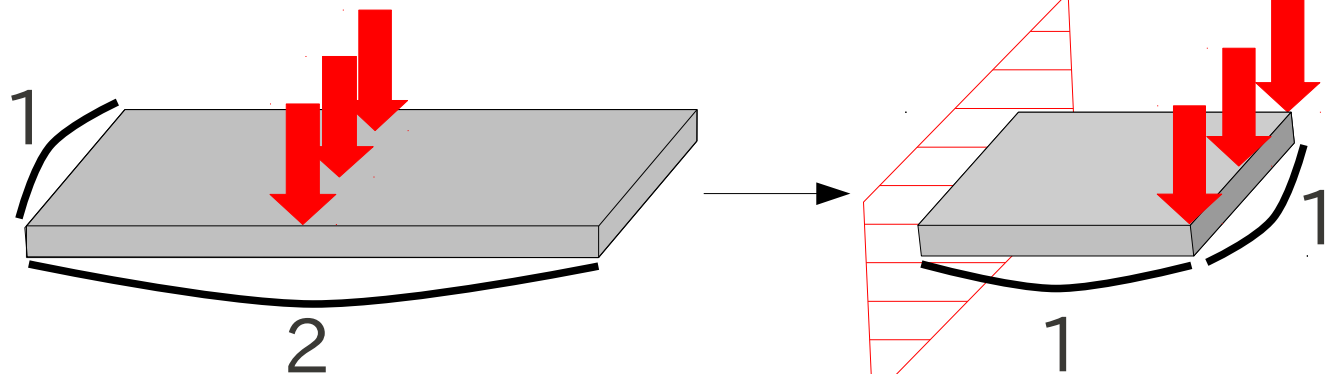
曲げ部材として

格子パネル



解析モデル

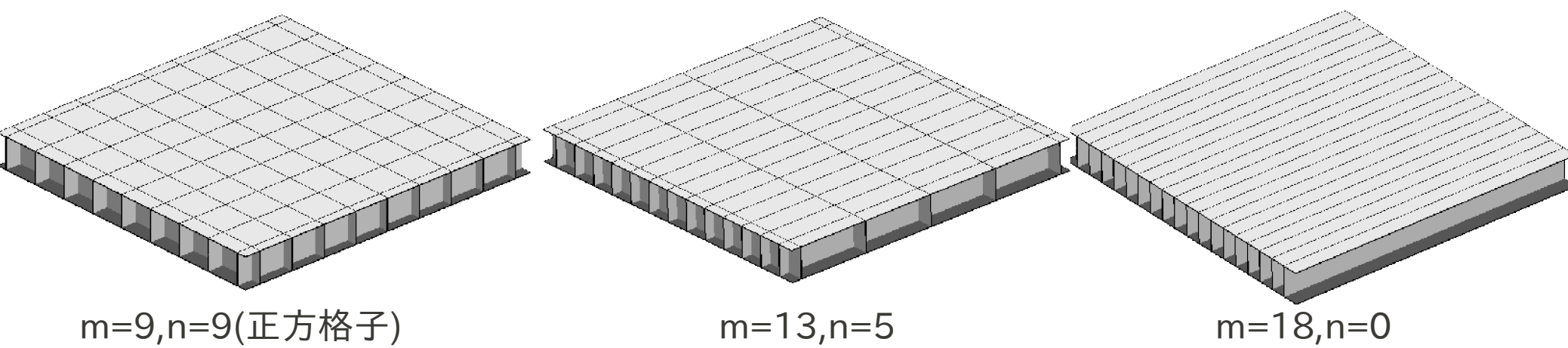
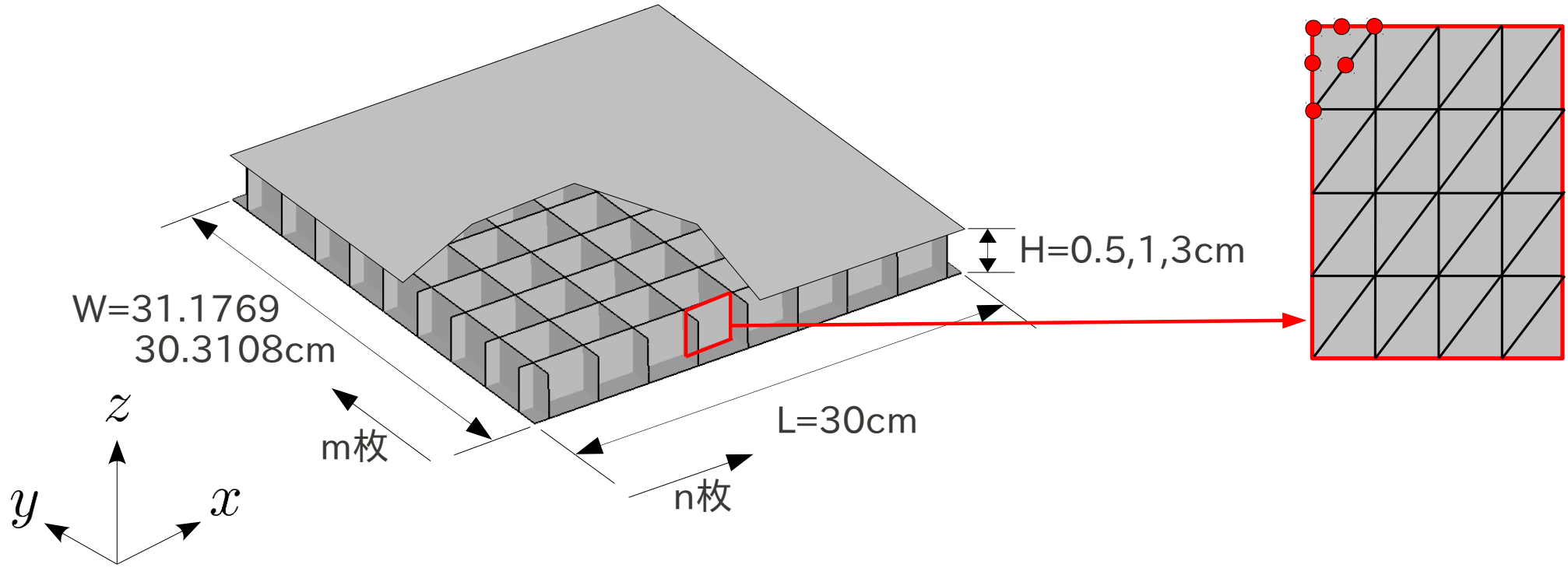
ハニカムパネル

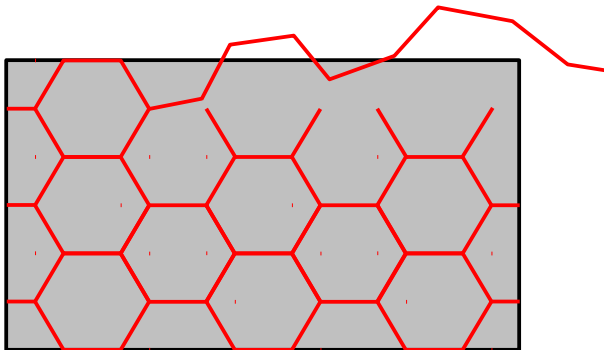


材料:アルミ

FEM解析:Calculix

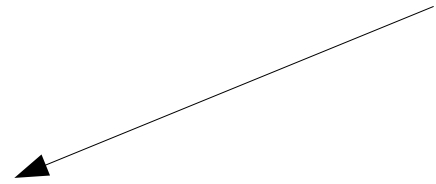
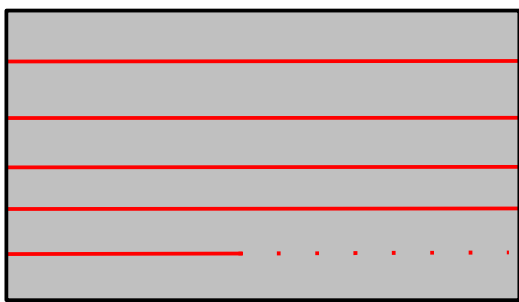
格子





— 壁の総長

同じにはできないので



足りない分増やす

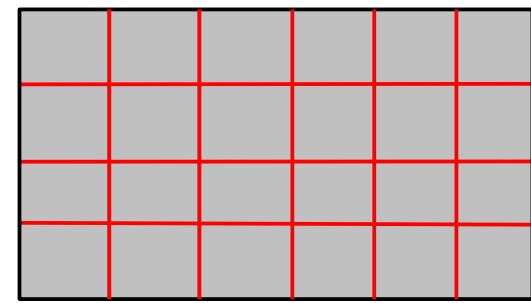
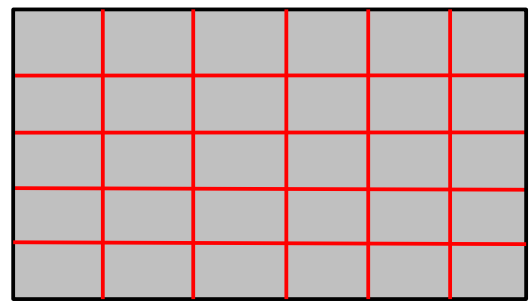
一本減らす



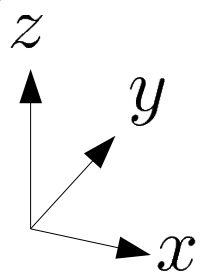
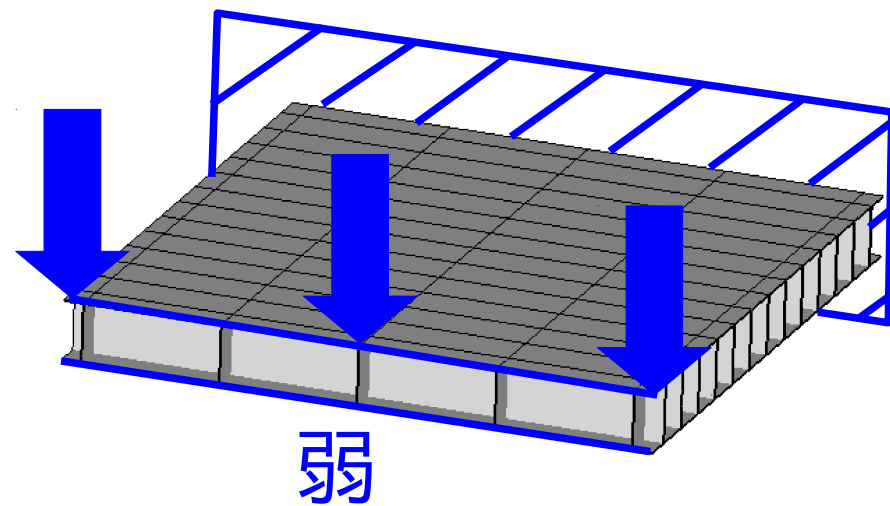
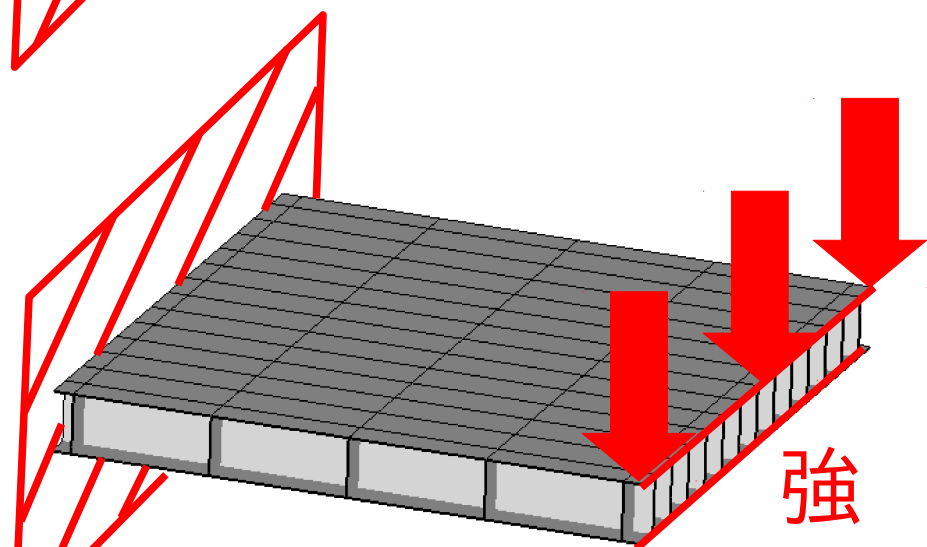
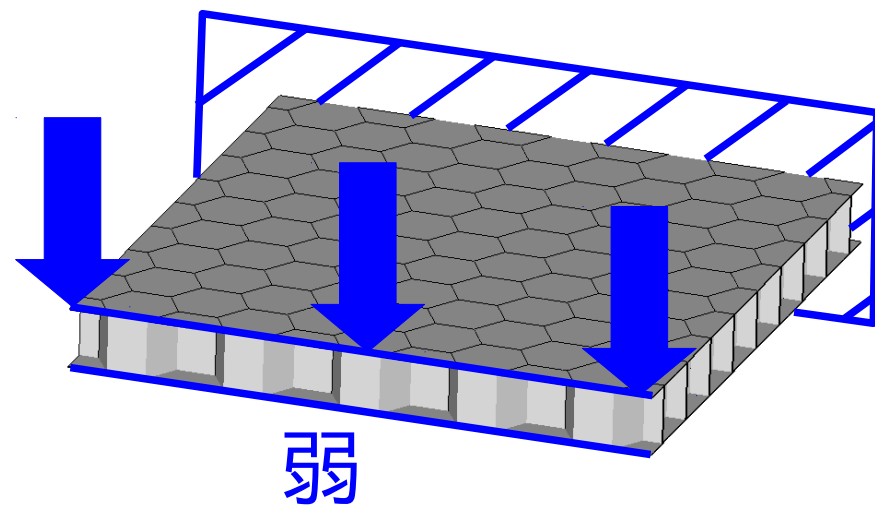
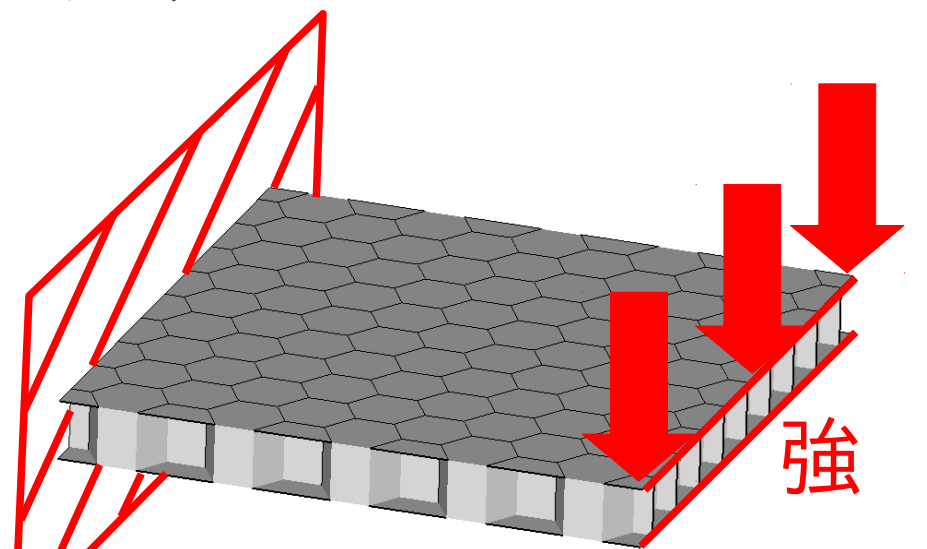
上限

下限

以下同じく

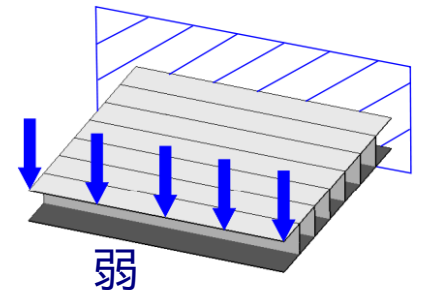
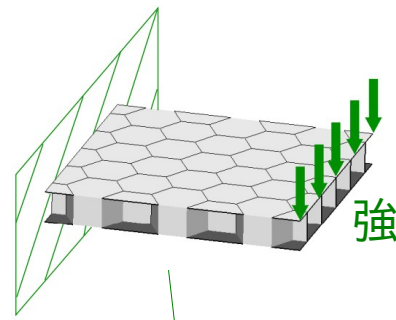
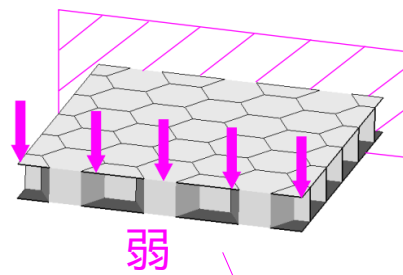


境界条件

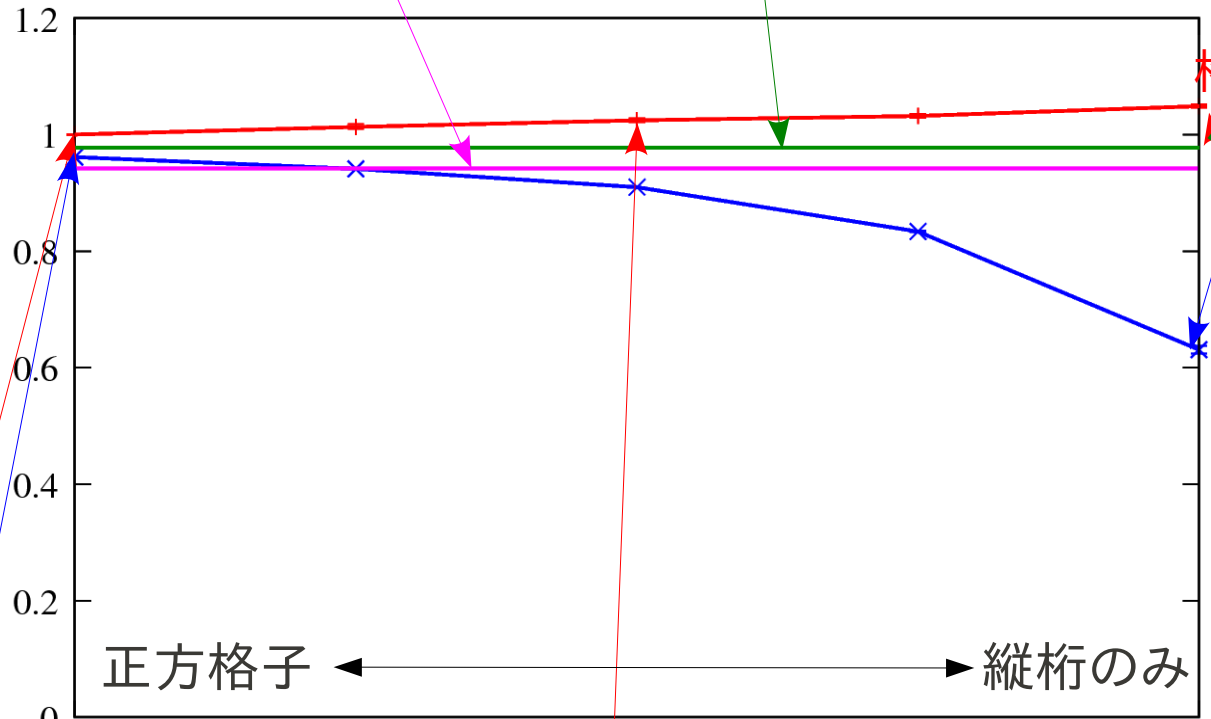


曲げ剛性

高さ1cm

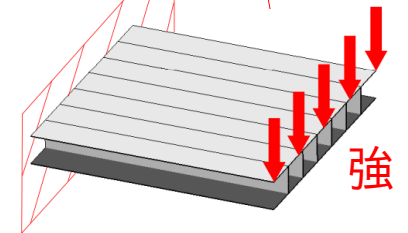
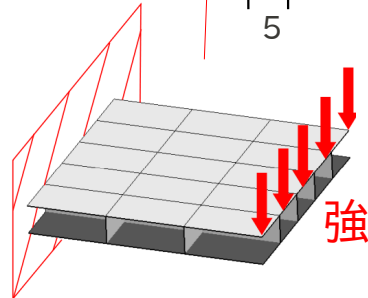
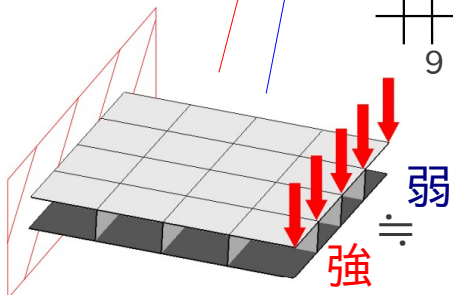
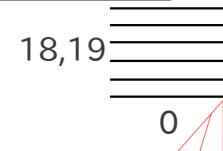
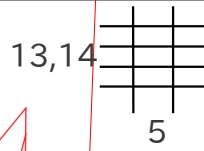
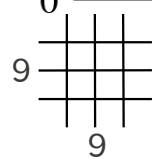


$$\frac{EI}{EI_{\text{正方格子}}}$$



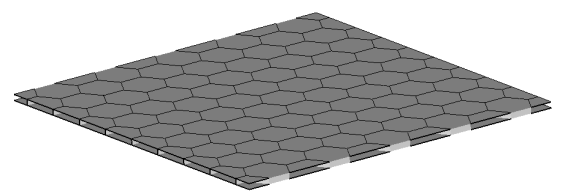
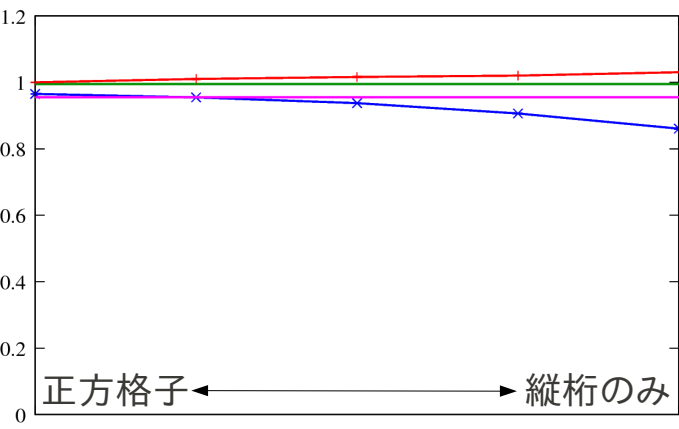
正方格子

縦桁のみ

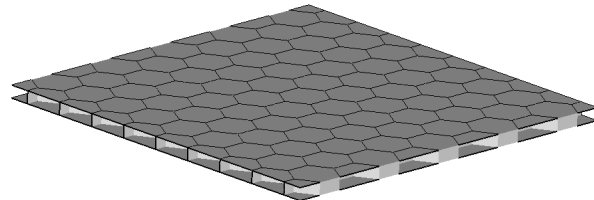
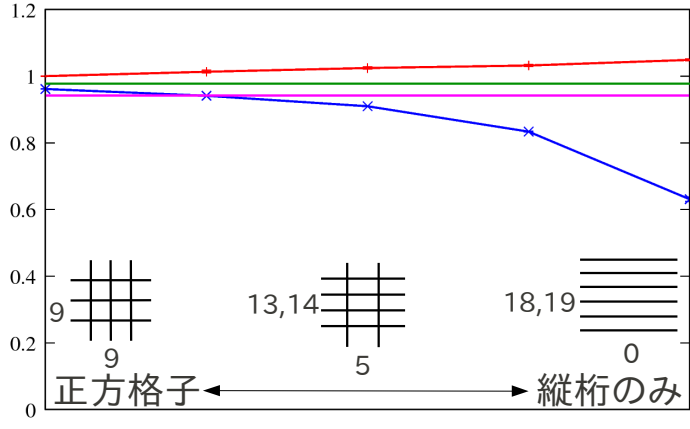


曲げ剛性

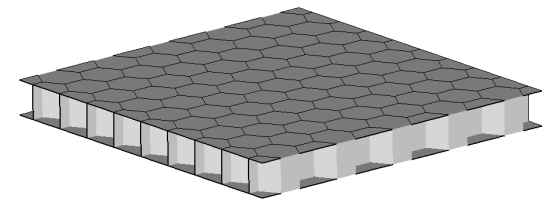
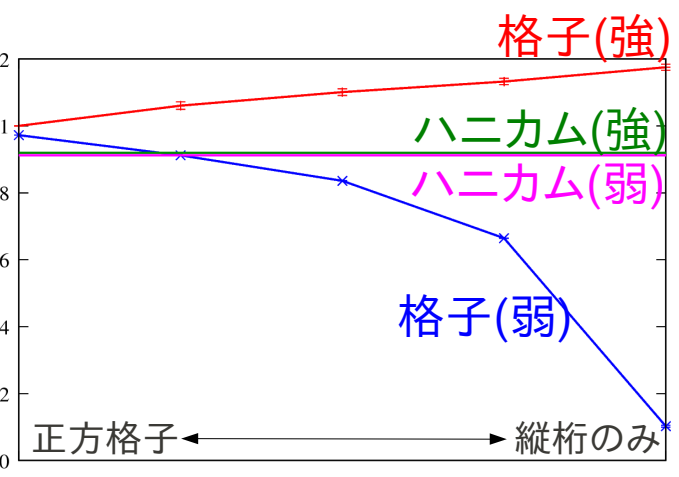
$$\frac{EI}{EI_{\text{正方形格子}}}$$



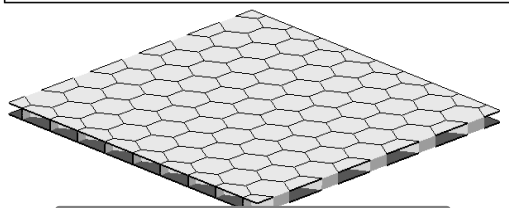
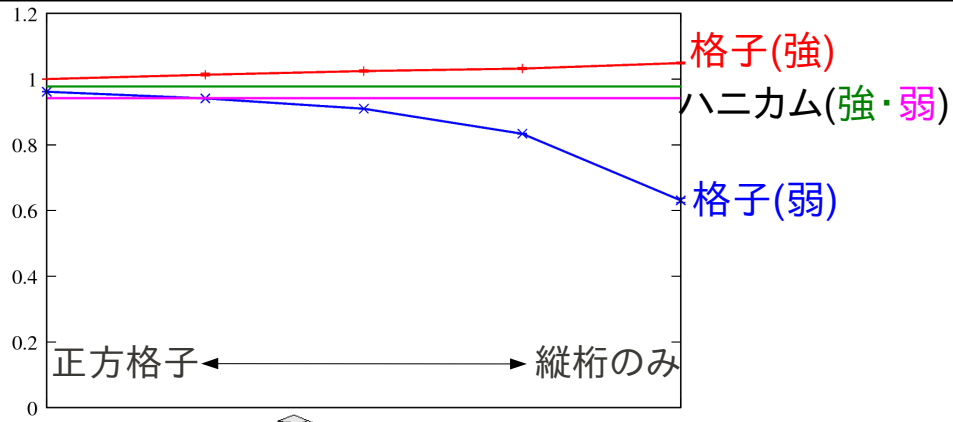
高さ0.5cm



高さ1cm

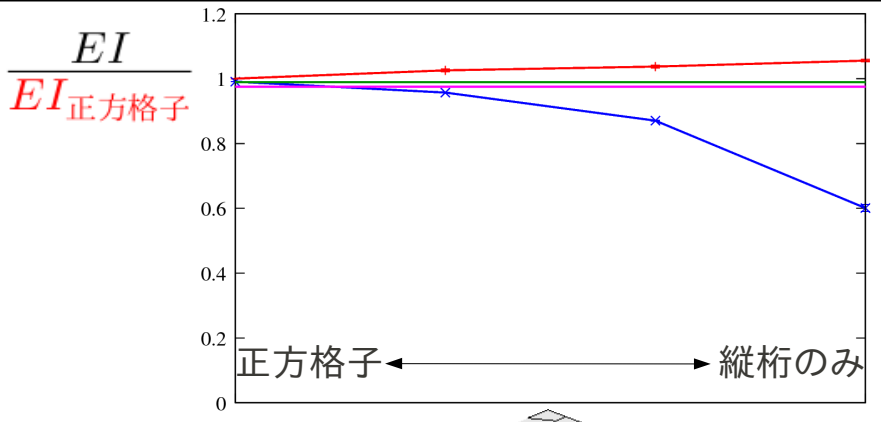


高さ3cm



セルサイズ $2\sqrt{3}$

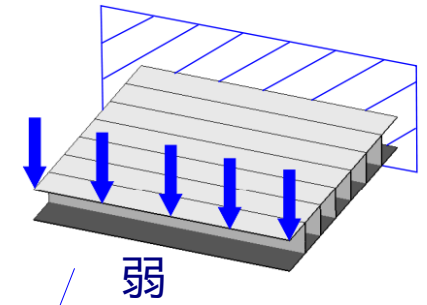
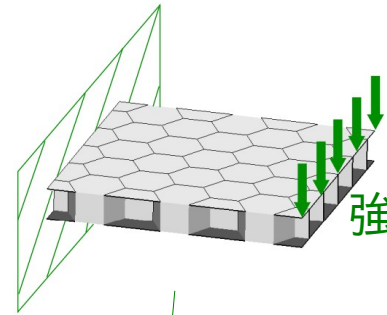
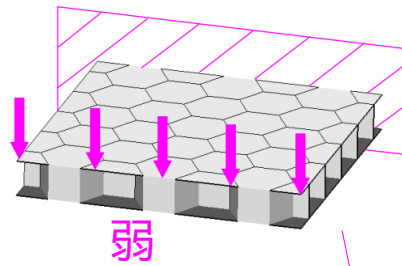
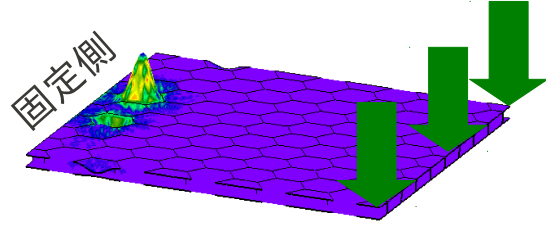
細



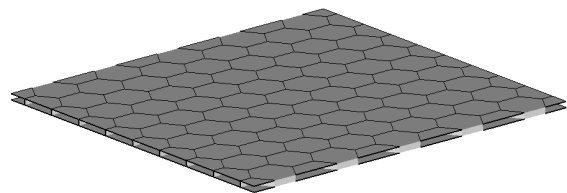
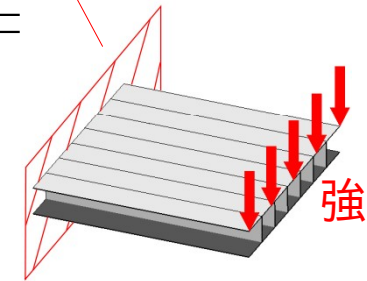
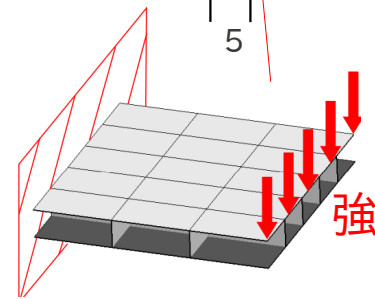
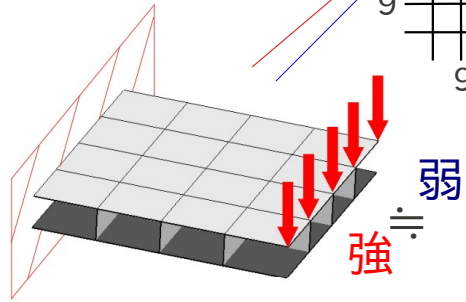
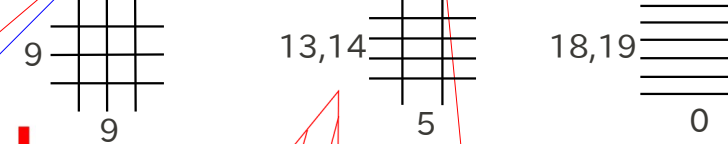
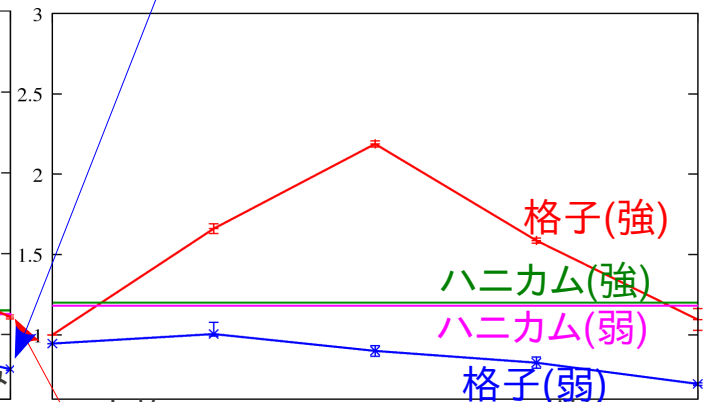
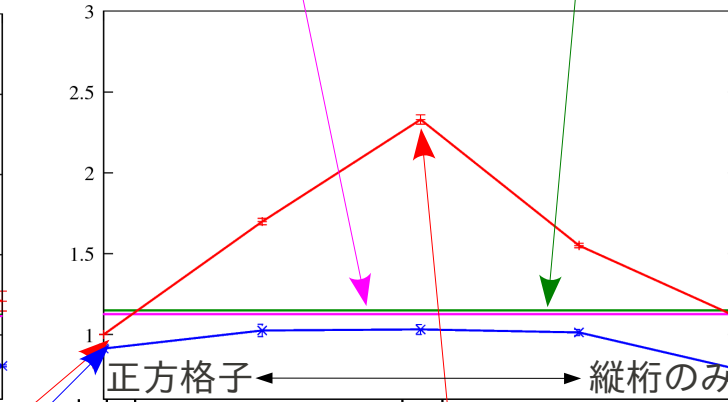
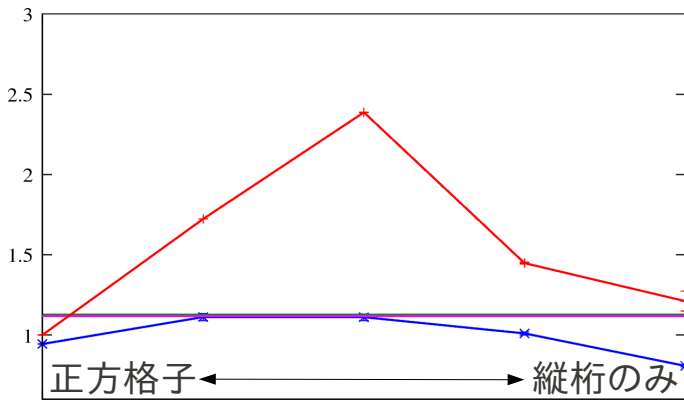
セルサイズ $2.5\sqrt{3}$

粗

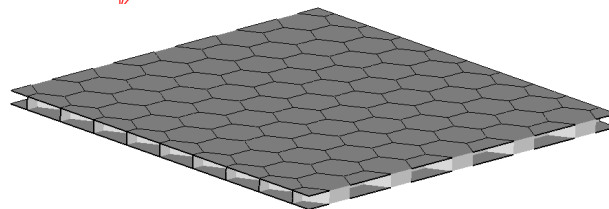
座屈荷重



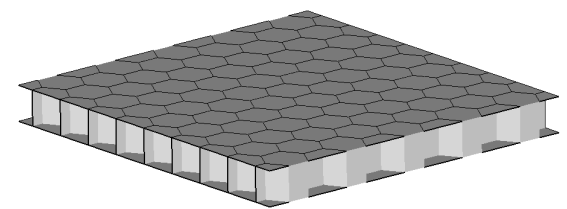
座屈荷重
座屈荷重 正方格子



高さ0.5cm

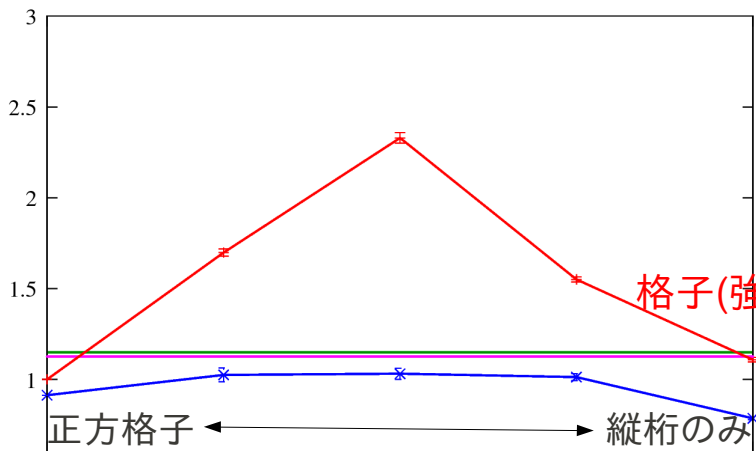
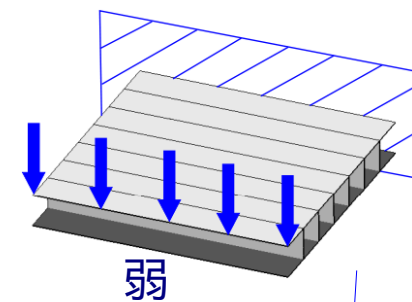
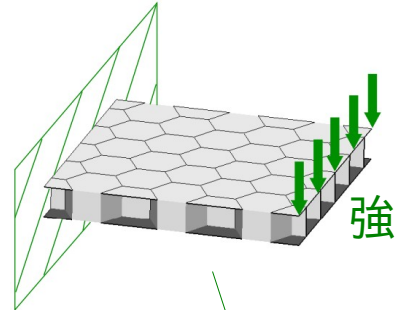
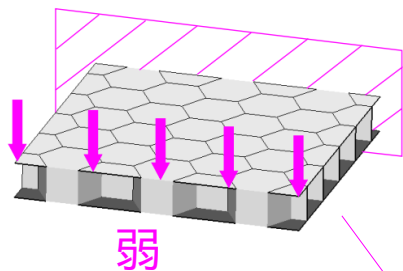


高さ1cm

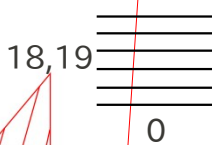
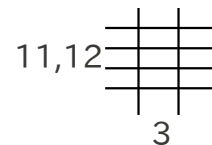
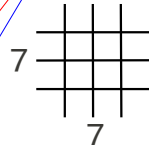
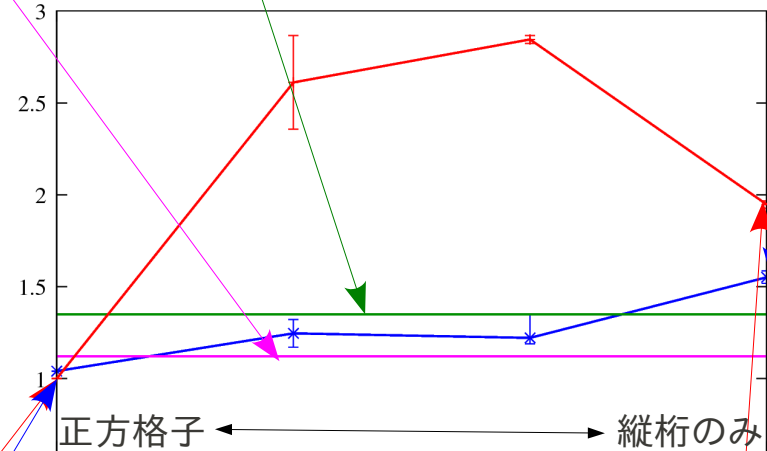


高さ3cm

座屈荷重



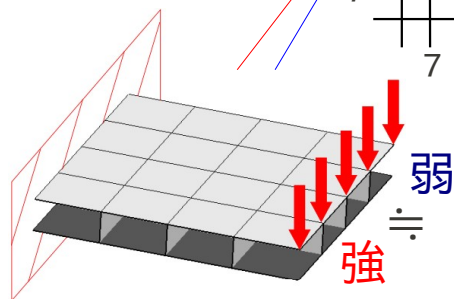
座屈荷重
座屈荷重_{正方格子}



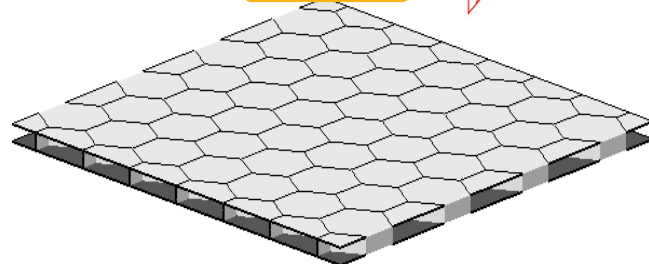
細



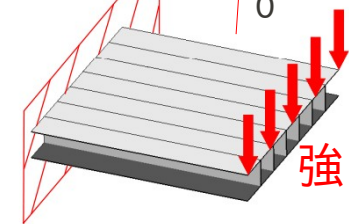
セルサイズ $2\sqrt{3}$



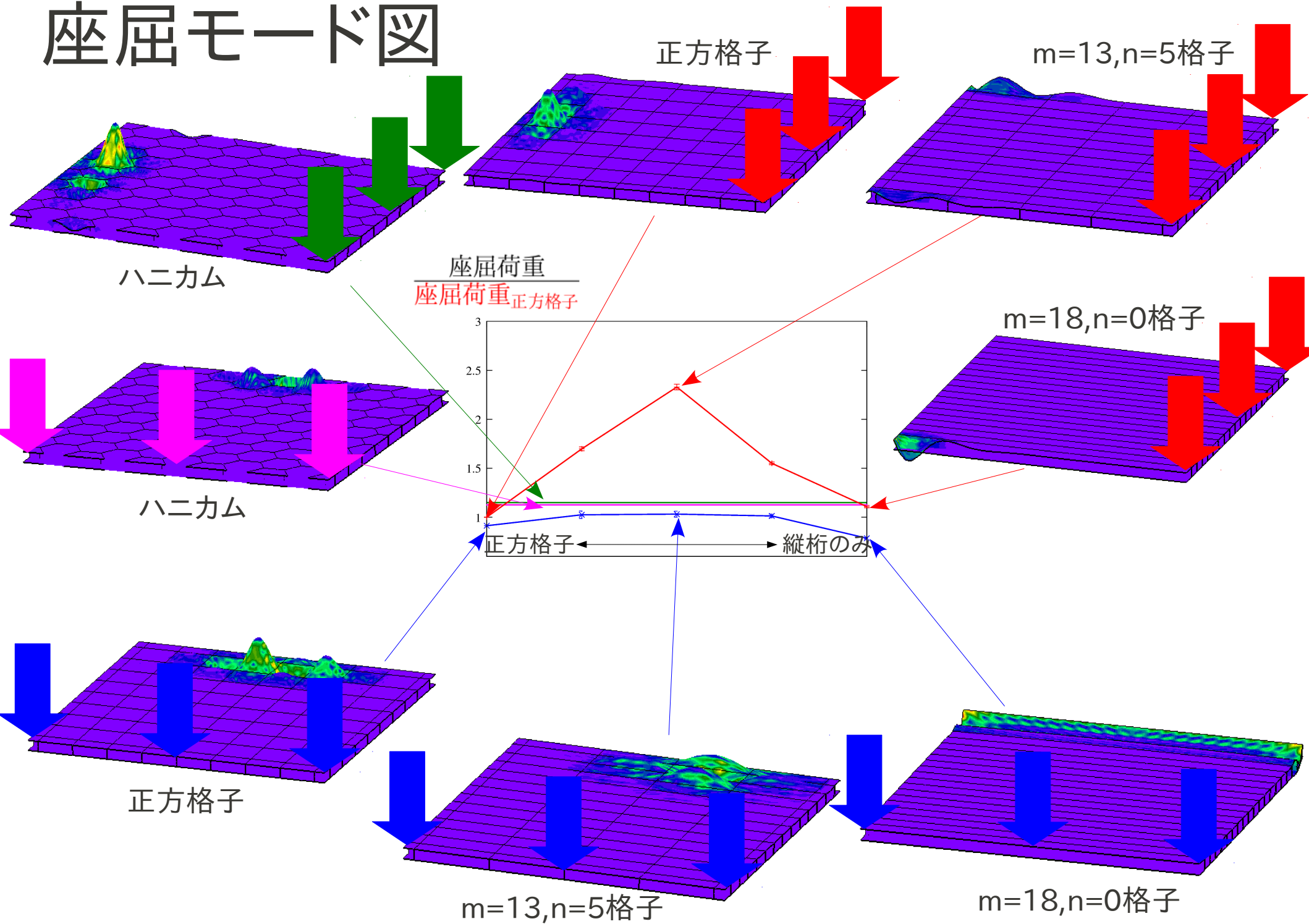
粗



セルサイズ $2.5\sqrt{3}$

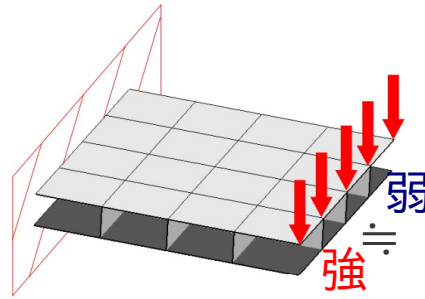


座屈モード図



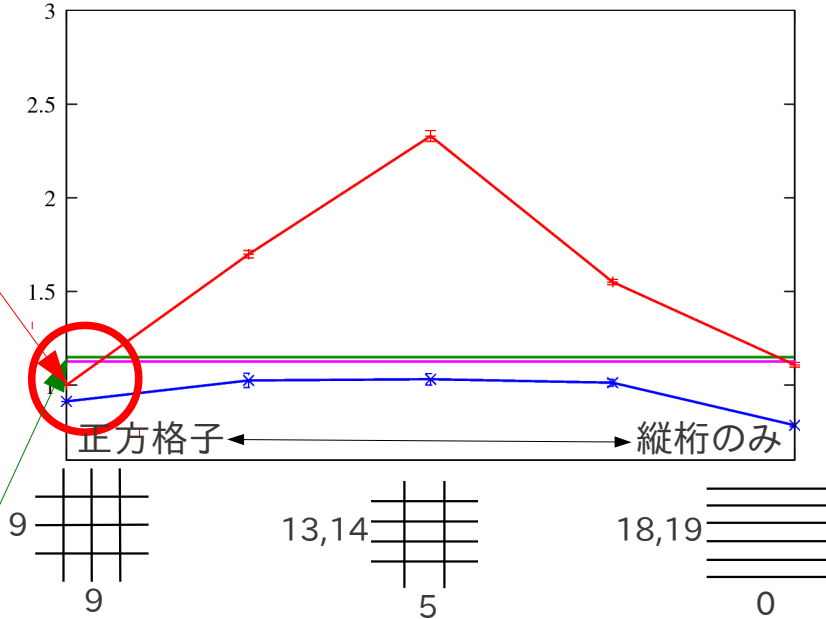
まとめ

曲げ剛性

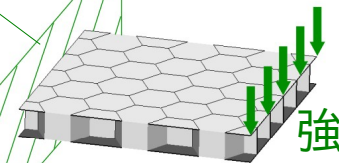
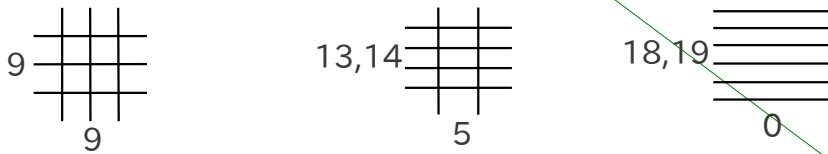
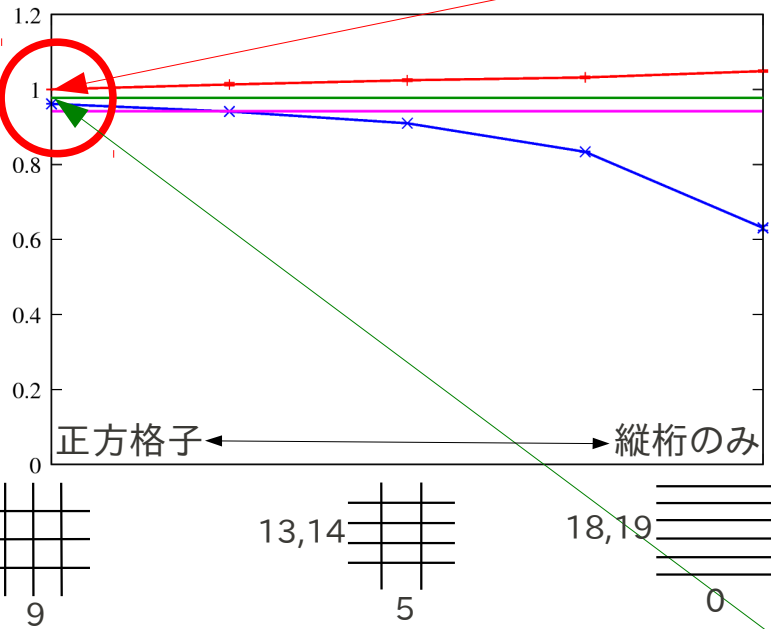


座屈荷重

座屈荷重
座屈荷重_{正方形格子}



EI
 $EI_{\text{正方形格子}}$



やや不利

ハニカムパネル

やや有利